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later pass, and about equal parts of the mass of mitochondria were included in each daughter cell. In other cells no such definite behavior of the mitochondria takes place. They remain scattered throughout the cytoplasm or are collected at the two poles of the cell during the formation of the daughter cells.

The question of the behavior of the mitochondria during the life history of the cell is one of great interest and we feel confident that this method of study of the living cell will be of great value not only for making observations upon the mitochondria, but also for the study of other activities of the cell.

Can we infer from these observations anything concerning the real nature of the mitochondria? Are they organs of the cell, functioning in a definite manner, in other words a living part of a living cell? If they are organs of the cell, are they concerned in the routine metabolism which takes place in all living cells or are they concerned with the process of differentiation of such structures as the myofibrillæ, neuro-fibrillæ, white fibrous tissue, etc.? On the other hand, are we dealing with inactive metabolic products of the cell, inactive in the sense of not being a part of the living protoplasm? If so, are they excretory products which later are extruded from the cell or storage products which are being continually formed by the activity of the cell and again used up in its metabolism? What relation do they bear to the metabolism of the nucleus, if any? The discussion of these most important points must be left for a more complete account of the mitochondria in tissue cultures which is soon to follow.

M. R. LEWIS,
W. H. LEWIS

JOHNS HOPKINS UNIVERSITY

ASTRONOMICAL AND ASTROPHYSICAL SOCIETY OF AMERICA

THE sixteenth meeting of the Astronomical and Astrophysical Society of America was held in Atlanta, Ga., in connection with the American Association for the Advancement of Science on December 29, 1913, to January 1, 1914. The general social features of this meeting participated in alike by the association and the affiliated societies

have already been described by the general secretary of the association.

In connection with the relation of this society to the association one matter may be mentioned. Following the adoption of the plan for large general quadrennial meetings the society voted to endeavor to meet with the association for these meetings.

The council elected the following persons to membership: The Rev. T. H. E. C. Espin, Tow Law, Co. Durham, England; Dr. C. C. Kiess, Laws Observatory, Columbia, Mo.; and to honorary membership, Professor G. F. J. Arthur Auwers, Bellevuestr. 55, Grosslichterfelde, Berlin, W., Germany.

The following members were in attendance: G. C. Comstock, W. S. Eichelberger, Philip Fox, C. H. Gingrich, C. S. Howe, W. J. Humphreys, F. R. Moulton, E. C. Pickering, W. F. Rigge, H. N. Russell, Frederick Slocum; and the following visitors from the association: William Bowie, S. M. Barton, E. B. Van Vleck, C. F. Emerson, and R. P. Stephens.

At the joint meeting with Section A of the association two admirable addresses were delivered. The retiring vice-president of the section, Professor E. B. Van Vleck, presented "The Influence of Fourier's Series upon the Development of Mathematics." The society was represented by Professor H. N. Russell, who spoke on "Relations between the Spectra and Other Characteristics of the Stars."

Aside from these two addresses the scientific program contained twenty-nine papers and a report from the committee on photographic astrometry. The titles are given below in the order of presentation.

"The Arlington Time Signals in Omaha," by W. F. Rigge.

"Astronomical Panoramic Views from a City Observatory," by W. F. Rigge.

"Micrometric Observations of the Holden and Küstner Double Stars," by Philip Fox.

"Note on the Present Spectra of Three of the Novæ," by W. S. Adams and F. G. Pease.

"Note on the Relative Intensity at Different Wave-lengths of the Spectra of Stars having Large and Small Proper Motions," by W. S. Adams.

"Mémorial on the Theory of Orbits," by F. R. Moulton.

"Faint Standards of Photographic Magnitude for Selected Areas," by F. H. Seares.

"Temperature, Rainfall and Sunspot Records," by W. J. Humphreys.

"An Easy Method of Drawing the Normals to a Parabola from any Point," by S. G. Barton.

"A Graphical Solution of Cubic Equations," by S. G. Barton.

"The Color of Faint Stars," by F. H. Seares.

"The Moon's Mean Longitude, 1908 to 1913," by F. E. Ross.

"Proper Motion of Telescopic Stars," by G. C. Comstock.

"Errors in the Right Ascensions of Newcomb's Fundamental Catalogue," by W. S. Eichelberger and H. R. Morgan.

"Stellar Parallaxes with the 40-inch Refractor," by F. Slocum and S. A. Mitchell.

"The Objective of the Sproul Telescope," by J. A. Miller and R. W. Marriott.

"Wendell's Photometric Measurements," by E. C. Pickering.

"On the Cepheid Type of Variation," by H. N. Russell.

"Oscillations in the Periods of Cluster Variables and the Coincidence of Visual and Photographic Maxima," by Harlow Shapley.

"The Discovery of Three Naked-eye Variable Stars," by Harlow Shapley.

"Note on the Use of Diffraction Effects in Stellar Parallax Work," by Frederick Slocum.

"Observations of Nebulae with an Objective-prism Camera," by E. B. Frost and H. L. Alden.

"The Location of the Sun's Reversing Layer," by S. A. Mitchell.

"Spectroscopic Notes from the Detroit Observatory," by R. H. Curtiss.

"Spectrographic Observations of the Nebulae," by V. M. Slipher.

"The Transmission of Terrestrial Radiation by the Earth's Atmosphere in Summer and Winter," by F. W. Very.

"Note on the Spectrum and Radial Velocity of ψ Persei," by Paul Merrill.

"The General Magnetic Field of the Sun," by G. E. Hale, F. Ellerman, and A. van Maanen.

"Color Equations of Photographs taken with the 16-inch Metcalf Telescope," by Henrietta S. Leavitt.

"Report of the Committee on Photographic Astrometry: I. Experiments with Wide-angle Cameras; II. Experiments with a Stationary Telescope," by Frank Schlesinger, Chairman.

The next meeting of the society will be held at Northwestern University in August of 1914.

PHILIP FOX,
Secretary

SOCIETIES AND ACADEMIES

THE ACADEMY OF SCIENCE OF ST. LOUIS

At the meeting of the Academy on January 5, Dr. Victor E. Emmel, of the Washington University Medical School, read a paper on "The Problem of the Origin of the Non-nucleated Red Blood Corpuscles."

Dr. Emmel stated that the various views which have arisen in the history of the problem may be briefly stated as including that of intra-cellular nuclear disintegration, nuclear persistence, the hematoblast theory, intra-cellular formation, and the nuclear extrusion theory. With the exception of the hematoblast theory, all of these views are still being seriously discussed, although at the present time that of nuclear extrusion has the greater number of adherents. In contrast to these theories the following results of a study of blood cultures and fresh and fixed blood of the pig embryo appear to support another possible mode of origin for the non-nucleated red blood corpuscles.

It was found that the erythroblast of the pig embryo in place of being spherical, as generally described, may in the later stages of cytomorphosis, assume a biconcave or cup shape; its nucleus becomes smaller, more compact, eccentric in position, and not infrequently flattened in form; mechanically rotated, the erythroblasts tend to orient themselves with the nuclear region remaining on the under side, as if loaded; and that their reaction to changes in osmotic conditions indicates a structural difference between the nuclear and cytoplasmic poles. These observations were discussed with reference to the question of the correlation of the form of the definite plastid with the enucleation of the erythroblast, and formation of a lecithin containing membrane, hemoglobin, differentiation, and the factors involved in determining the eccentric position of the nucleus.

In some eighty culture experiments non-nucleated erythrocytes or plastids were observed to arise from the parent erythroblast by a process of cytoplasmic constriction. In size, form, hemoglobin content and stain these culture plastids are comparable to the normal circulatory plastids. Observations on living and fixed material indicate the occurrence of a similar process within the embryo. These results accordingly raise the question whether the origin of non-nucleated red blood corpuscles by a process of cytoplasmic constriction rather than by nuclear extrusion or intracellular nuclear disintegration does not merit more serious consideration.

G. O. JAMES,
Corresponding Secretary